Feed the Future Innovation Lab
For *Collaborative Research on Nutrition* - Africa
Purdue University - Annual Report - Year 4

Feed the Future Innovation Lab

For Collaborative Research on Global Nutrition

Annual Report
Purdue University
Year 4 (2013-2014)
Feed the Future Nutrition Innovation Lab-Africa

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Objective 1 (from Year 4 Implementation Plan): Research

Understand and measure the connections between agricultural capacity, technology adoption, nutrition outcomes, and conditioning factors at levels of aggregation ranging from household to district. The key objective is to develop an empirically-based and data-driven understanding of the overlap between agricultural issues and health/nutrition issues in Uganda, so as to improve the effectiveness of nutrition policy in Uganda and elsewhere, especially in the United States Agency for International Development (USAID) Feed the Future countries of East Africa.

Substantial progress achieved, as detailed below.

Objective 2 (from Year 3 Work Plan): Data Collection and Analysis

(a) Analyze agricultural price data obtained with the help of project partners at the International Food Policy Research Institute (IFPRI) and link these to nutrition outcomes; and (b) Continue to work with a collaborator at the University of North Carolina to analyze data from a small household panel survey conducted in six villages of Western Uganda (which extends a panel with earlier rounds in

2003 and 2007) to understand patterns of cooking technology, meal response to fuel price changes and health impacts, primarily acute respiratory infection (ARI).

Substantial progress achieved, as detailed below.

Objective 3 (as stated in Year 3 Work Plan): Capacity Building

Increase the capacity and effectiveness of research institutions in Uganda, especially in the College of Agriculture at Makerere University. Train students at the graduate level to become contributing members of the global community fighting against hunger and malnutrition.

Activities ongoing, as detailed below.

Introduction/Overview of Work Plan Rationale/Objectives:

Uganda faces a number of development challenges, including chronic and widespread child malnutrition. Current knowledge and national capacity to address these challenges is insufficient. This Work Plan focuses on studying available observational evidence regarding food security, malnutrition and related topics in Uganda and to undertake primary research and data collection to fill knowledge gaps on key issues related to agriculture, health and nutrition, and to simultaneously engage in training to improve knowledge and capacity in Uganda.

Research and capacity building are being undertaken in a manner that aims to be synergistic with USAID Community Connector goals and objectives. Activities are closely aligned with the Feed-the-Future orientation of delivering "Purpose-Driven Research" by: (1) directly addressing socio-behavioral, economic and market factors related to technology and practice adoption; (2) targeting efforts in areas where the poor and malnourished are concentrated; and (3) transforming production systems to ensure enhanced food safety and nutrition. The activities outlined below build upon prior efforts and have been designed based on ongoing discussions with fellow researchers and NIL partners. The aim is to leverage investments in data collection, student training and data analysis to generate knowledge that is useful to inform agriculture and nutrition policy in Uganda and elsewhere.

Section I: Research Activities

Focal area: *Policy-relevant, hypothesis-driven research on agriculture and nutrition*

Activity 1: In previous years, we secured access to a number of datasets, including multiple rounds of the Uganda National Household Survey (UNHS), Uganda Demographic and Health Survey (DHS) data, and remotely-sensed satellite data

(maximum value Advanced Very High Resolution Radiometer (AVHRR) Normalized Difference Vegetation Index (NDVI) composites from the NASA Global Inventory Monitoring and Modeling Systems (GIMMS) group at NASA's Biospheric Sciences Branch). We supplemented these data with agricultural commodity price data from Uganda with both spatial and temporal resolution. Our ongoing efforts aim to analyze this complex, multi-layered dataset and report findings in a series of working papers, journal articles and policy briefs. This research was part of a student MS thesis completed at Purdue University in Year 3 and constitutes the ongoing focus of one PhD student and one additional MS student at Purdue. The MS student will finish in May 2015. The PhD student is on track to complete his program in May 2016.

Focal area: *Discrete socio-economic analysis on key topics*

Activity 2a (Price Analysis): In many settings, nutrition outcomes have been shown to be sensitive to levels and variability of food prices. During the year, we made substantial process in compiling, cleaning and analyzing monthly price data for the period 1999 to 2008. These were obtained with the help of project partners at IFPRI and cover 23 markets and 29 commodities in Uganda. The PhD student conducting this research completed a review of the literature on agricultural price analysis and has designed protocols for price data analysis and linkages with remotely-sensed data and DHS child-growth data. We have determined that it is feasible to link these price data to both DHS and remotely-sensed data, and will be combining additional secondary data to support analysis of the constructed dataset.

Activity 2b (Fuel Use and Upper Respiratory Disease): In the early years of the project, we capitalized on an opportunity to leverage USAID BASIS AMA financial resources to collect survey data in six villages of Western Uganda. The survey was used to extend a household panel (with earlier rounds in 2003 and 2007), adding new information on cooking technology, meal response to fuel price changes and health impacts, primarily acute respiratory infection (ARI). Leveraging these data to measure health and nutrition interactions in the face of rising fuel prices and associated changes in household cooking behavior provides insights into an under-studied aspect of nutrition in Uganda, in particular as it impinges on home preparation of infant-weaning foods. Activities undertaken directly address food quantity and quality concerns as articulated in the Feed-the-Future program. They also place agricultural production and household decision making within a larger context that spans biophysical, policy and social elements of household health and nutrition production systems. During Year 4, we continued to analyze these data, including an additional round of data collected in 2012, and published findings in the peer-reviewed press. In addition, as a synergistic activity, an MS student is currently extending the analysis to a nationally-representative sample of households and expanding the scope of the investigation to measure connections between ARI evidence and child growth outcomes.

Lessons learned and challenges in implementing proposed activities

Delays in initial approval and launch of the project created impediments to project start-up, but these have mostly been overcome. However, one consequence is that the PhD student from Uganda who is studying at Purdue will not complete his degree during Year 5 of the project. He is expected to complete his degree in May 2016, during Year 6 of the program (if the program continues).

Solutions/resolutions applied or to be applied

We remain committed to integrating all of our activities with the Management Entity (ME) and the mission.

Section II: Capacity-Building Activities

Focal area: *Degree training*

Activities: Considerable effort was devoted to identifying a student from Uganda for degree training at Purdue. One student secured admission to the PhD program in Agricultural Economics at Purdue University. George Omiat began his PhD training in August 2012 and is currently a student in good standing, having passed his qualifying examination in the summer of 2014. Mr. Omiat was formerly a junior faculty member at Makerere University, and has been granted leave from that institution to complete his studies in the US. It is expected that upon completion, he will be absorbed back into the teaching/research faculty at Makerere. In the past year, we added a new student to the project, Onyekachi Aghasili, a Nigerian woman who is completing her MS in Agricultural Economics at Purdue. She is studying connections between acute respiratory infection and child growth outcomes. She is partially supported by the NIL project and partially supported as a teaching assistant for a course on World Food Problems.

Lessons learned and challenges in implementing proposed activities

Identifying well-prepared Ugandan candidates for graduate-degree training in the US was a significant early challenge. From a logistical point of view, it would have been desirable to train several MS students under the project, but early project delays and the substantial investment in student recruitment, screening and processing meant that we have been able to train only one student at the PhD level.

Solutions/resolutions applied or to be applied

Mr. Omiat has been processed through TraiNet, and we have made a commitment to funding the student as part of the NIL project. Hence, it is essential that we maintain continuity of funding to support the student through completion of his degree. If the

NIL project ends before he completes his degree, we may need to hold budget in reserve and explore options for a no-cost extension beyond 2015.

Outputs (not previously or elsewhere reported)

Brown, Molly, Kathryn Grace, Gerald Shively, Kiersten Johnson and Mark Carroll. 2014. "Using Satellite Remote Sensing and Household Survey Data to Assess Human Health and Nutrition Response to Environmental Change." Forthcoming in *Population and Environment*.

Jagger, Pamela and Gerald Shively. 2014. "Land Use Change, Fuel Use and Respiratory Health in Uganda." *Energy Policy* 67: 713-726.

Leveraging and Cost Sharing

We continue to find ways to leverage non-project resources and cost-share contributions to the project. These include one MS student who was cost-shared by Purdue University and a second MS student who is partially funded by Purdue. We continue to work closely with Pamela Jagger at the University of North Carolina, who has separate funding to support her research in Uganda. We estimate that the NIL is leveraging approximately $50,000 of non-NIL support in Year 4. This does not include the substantial leveraging that comes as part of our collaboration with Dr. Molly Brown at NASA to use remotely-sensed data. This collaboration represents leveraging of several hundred millions of dollars of past US investment in data collection at NASA.

Vignettes

See Nepal report.